1. Purpose

Buildings with multiple household units need to be designed to safeguard people from illness or loss of amenity because of undue noise being transmitted between occupancies.

Further, there have been a number of enquiries about the requirement to upgrade the Sound Transmission Class (STC) and Impact Insulation Class (IIC) ratings when building alterations are proposed and there is a need to upgrade existing buildings in accordance with Clause G6 of the New Zealand Building Code.

STC numbers are a measure of resistance of a building element such as a floor or wall, to the passage of audible airborne sounds. Audible sounds are defined as voice, music, or any other noises not related to impact sound; the higher the STC number the better airborne sound insulation.

Impact sound originates when one body strikes another, such as in the case of footsteps, hammering, and objects falling. Impact sound travels through the structure with little loss of energy if the structure is continuous and rigid. Transmission of impact sound can be controlled by isolation; the higher the IIC number the better the impact sound insulation.

This practice note is intended solely for the use of Auckland Council employees and must not be used as a substitute for professional advice.

Note: this practice note now incorporates AC2237

2. Legislative requirements

New buildings

In terms of Section 49 of the Building Act 2004, the BCA needs to be satisfied on reasonable grounds that the provisions of the Building Code will be met if the building work is completed in accordance with the plans and specifications that accompanied the application.

The Building Code requirements are set out in Clause G6 “Airborne and Impact Sound”; this clause sets out the performance of building elements between occupancies to prevent undue noise transmission from the occupancies or common spaces to the habitable space of household units as follows:-

G6.3.1 the sound transmission class of wall floors and ceilings, shall be no less than 55

G6.3. the impact Insulation class of floors shall be no less than 55 (note NZBC/G6 permits field test results to be within 5dB of the performance requirement

S.112 alteration of an existing building

1. A building consent authority must not grant a building consent for the alteration of an existing building, or part of an existing building, unless the building consent authority is satisfied that, after the alteration, the building will-

   b) continue to comply with the other provisions of the Building Code to at least the same extent as before the alteration

Note: Under s.112, the alteration must not reduce compliance with the Building Code and we cannot insist on an upgrade.
Clearly there are no specific requirements identified requiring an upgrade of the STC or IIC rating. However, an alteration in a normal sense usually applies to new building work and this new building work needs to demonstrate compliance with the Building Code in all respects.

**Example**
Alterations are being undertaken on an existing two-storied multi-unit residential development. The primary structure, which in this instance comprises of concrete floors and masonry exterior walls, is not being altered. The internal walls between existing units are being demolished and rebuilt in a different location in order to alter the size of the existing units.

All new inter-tenancy walls (new work) must comply fully with the requirement of G6 and any other relevant provisions of the Building Code. However, existing walls and floors that are unaltered are not required to be upgraded for compliance with the requirements of G6.

**S.115 Change of Use**
Under s.115 where the change involves the incorporation into the building of one or more household units and the household units did not exist before, the TA is required to be satisfied on reasonable grounds that the building in its new use will comply as nearly as is reasonably practicable, with the Building Code in all respects. This includes assessing means of escape from fire, protection of other property, structural performance, fire rating performance and access and facilities for people with disabilities (if required by s.118).

This also means that if an office floor in a multi-storey building is converted to a residential unit, all new walls must fully comply. Existing floors / ceilings and walls must be considered for upgrade to as nearly as is reasonably practicable with the requirements of G6.

### 3. Building Code interpretations and clarification

Where an existing multiple occupancy building is being renovated it is not required to meet G6 (soundproofing) of the Building Code. However, any new building work associated with the alteration needs to be fully compliant with the Building Code. Thus, in the case of a building as in the example above, which has new party walls constructed then the new walls need to meet the STC requirements of the Building Code. We cannot however ask for the existing structure of the building to be upgraded other than in regards to fire and structural safety or if the purpose group was included for under section 118.

New buildings must fully comply with Section G6 of the Building Code and pass soundproofing inspection tests. In this instance, the processing officer must insert a building consent condition identifying that an acoustic inspection and report confirming compliance is required; the cost of this inspection is borne by the applicant.

### 4. Building consent and resource consent conditions

**Building consent**
A building consent application involving adjoining residential units may need to be accompanied by an “acoustic report”. Design details and material specifications must be provided for the building work, to demonstrate the performance requirements of Clause G6.

Under section 90 of the Building Act 2004, a building consent condition is applied in terms of inspections; this section of the Act requires that an agent authorised by the BCA is entitled to inspect the building work which includes undertaking acoustic tests to confirm compliance with the Building Code.

Building consent applicants can either engage a suitably qualified acoustic engineer to conduct on-site testing or use Councils agent. The acoustic engineer must provide a written report confirming compliance. Acoustic engineers must be independent and not have a conflict of interest in the project (i.e. they cannot be involved with the design).
Resource consent
RMA requirements or conditions cannot be made a condition of the building consent. However, these requirements can be enforced by compliance officers working under the RMA. The enforcement processes of the RMA will need to be used in cases of non-compliance.

Typically, the district plan will have conditions requiring acoustic insulation to external walls near airports, industrial complexes, sports grounds or major arterial traffic routes.

The difference between the Building Act and Resource Management Act (RMA) is that the Building Code deals with sound transmission through inter-tenancy walls and floors / ceilings of abutting residential household units and other occupancies whilst the RMA deals with external sound.

There are specific instances where the conditions of resource consent identify that STC ratings are necessary. An example of this situation occurred at the Scene 1, 2 and 3 apartments. These apartments fronted onto the Fergusson Wharf complex and were subject to specific STC requirements under the resource consent granted for this development. Under the conditions of resource consent, there was a condition to ensure that the design met certain STC ratings to reduce external sound from the working wharf and the building consent required that adequate ventilation was provided when the windows were closed. This meant that mechanical ventilation was required to comply with NZBC/G4.

To ensure a cost-effective process was adopted, Council engaged an acoustic consultant to monitor the external walls (to ensure compliance with the conditions of the resource consent) and the internal walls (to ensure compliance with the conditions of building consent).

5. Acoustic inspections vs. testing

Acoustic inspections
Council inspectors undertake the inspection of acoustic construction (framing, sealants, insulation, etc); however, an acoustic engineer must undertake testing and provide a PS4 to Council.

Acoustic testing
Acoustic testing must be undertaken by a suitably qualified acoustic engineer. Applicants may either use Councils contractor or an external consultant to complete these tests.

Council contractor
If Council’s contractor is nominated, we do not need to agree to the inspection, testing methodology and scope of inspections; but a condition requiring acoustic testing is applied and a fee is charged for inspections undertaken on Councils behalf.

If the applicant chooses to use Councils contractor, Council charges the inspection fee at the time of invoice; please contact the agent for prices as fees vary depending on number of residential units involved (i.e. on a case-by-case).

Contact details for Councils contractor are:
    Acoustics Enforcement NZ
    Phone: 021 226 8784
    Email: inspections@aenz.co.nz

External contractor
If an external acoustic engineer is nominated, the inspection, testing methodology and scope of inspections, (i.e. number of apartments and locations to be tested) must be determined and agreed beforehand (in the same manner as we agree to producer statements). A written report is required on completion of the testing.
6. Acoustic inspection and testing requirements

Acoustic testing is only required on multi-storied residential tenancies where units are above and beside each other (see examples 3 and 4 below)

<table>
<thead>
<tr>
<th>Construction type</th>
<th>Elevation</th>
<th>Inspection by Council Inspector</th>
<th>Test by engineer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Single storey townhouses (units adjacent to each other)</td>
<td>Unit 1 Unit 2 Unit 3</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Unit 1 2-storey townhouse Unit 2 2-storey townhouse Unit 3 2-storey townhouse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Two-storey townhouses (units adjacent to each other)</td>
<td>Unit 1 Unit 2 Unit 3</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Unit 1 2-storey townhouse Unit 2 2-storey townhouse Unit 3 2-storey townhouse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Multi-story residential units (units adjacent and above)</td>
<td>Unit 1 Unit 2 Unit 3 Unit 4 Unit 5 Unit 6</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Unit 1 2-storey townhouse Unit 2 2-storey townhouse Unit 3 2-storey townhouse</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unit 1 (Residential) Unit 2 (Residential) Unit 3 (Residential)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unit 1 (Retail) Unit 5 (Office) Unit 6 (Retail)</td>
<td></td>
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</tr>
</tbody>
</table>

If acoustic testing is required, the processing officer must insert a building consent condition requiring testing (refer section 7).
7. Guidelines for conducting acoustic testing

**Resource consent**

External façade (for situations where there is a resource consent condition requiring that the building be constructed to achieve 35dBA inside the building)

External façade soundproofing compliance tested using the IS0 140:5 D2MNT test method, the source method shall be determined on site at the time of inspection. The reasons for choosing this method must be stated in the report provided to Council.

Source methods for testing soundproofing:
- global loudspeaker method;
- global traffic method;
- global railway traffic method; or
- global air traffic method

**Building consent**

Compliance with section G6 (soundproofing) of the Building Code is interpreted as achieving 1STC 50 or better and IIC 50 or better, onsite between abutting occupancies, during random soundproofing tests undertaken by a suitably qualified independent acoustic engineer.

Soundproofing tests shall be conducted
- within the building; and
- include a tapper test from
  - upstairs occupancy interior floor;
  - upstairs occupancy exterior deck to a downstairs kitchen; or
  - a lounge or bedroom in an abutting occupancy
- STC's must be checked using test procedures ASTM E 336/ASTM E 413
- IIC's must be checked using test procedures ISO 140.7 and ASTM E 989
- ASTM E 989 is a test rating method for floor-ceiling assemblies only
- A suitably qualified independent acoustic engineer must undertake acoustic testing; floor coverings must be in place prior to requesting the inspection

**New buildings:** Council recommends that applicants perform soundproofing progress tests during the various stages of construction, to avoid the possibility of failure when work is complete.

**Existing buildings:** Council recommends that soundproofing ratings for existing buildings be tested prior to the alteration, subdivision or change of use taking place and throughout various stages of construction to avoid the possibility of failure when work is complete.

**Testing**

A suitably qualified independent acoustic engineer who has not been involved in the design of the building must conduct testing.

8. References

Building Act 2004 sections 18, 49, 112, 115 and 118
Building Code Clause G6 Airborne and impact sound

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1 There is a 5% tolerance allowable under G6 when conducting testing on-site